



Some Implications of Increasing U.S. Forces in Iraq

April 2007

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Preface

The Administration is currently planning (and has begun to execute) an increase in U.S. ground forces in Iraq. That plan calls for increasing the number of U.S. combat brigades in-theater by 5 above the December 2006 level of 15, peaking at 20 combat brigades deployed. At this time, the Administration has not specified how long it plans to sustain the increase.

This Congressional Budget Office (CBO) paper—prepared at the request of the Chairman of the Subcommittee on Defense of the House Committee on Appropriations and the Chairman of the House Committee on the Budget—addresses the effects of increasing U.S. forces in Iraq on the readiness of U.S. ground forces as well as the effects of not increasing U.S. forces or completely withdrawing those forces from Iraq. The paper updates the analyses contained in two previous CBO reports on the subject, *An Analysis of the U.S. Military's Ability to Sustain an Occupation in Iraq* and *An Analysis of the U.S. Military's Ability to Sustain an Occupation in Iraq: An Update*, to reflect the potential effects of the Administration's plan to increase U.S. forces in Iraq. In keeping with CBO's mandate to provide impartial analysis, the paper makes no recommendations.

Adam Talaber of CBO's National Security Division prepared this paper under the supervision of J. Michael Gilmore and Matthew S. Goldberg. Peter Fontaine, Douglas Hamilton, Arlene Holen, Donald Marron, and David Newman reviewed the paper. James Quinliven of the RAND Corporation also reviewed the paper. (The assistance of an external reviewer implies no responsibility for the final product, which rests solely with CBO.)

Christine Bogusz edited the paper, and John Skeen proofread it. Maureen Costantino prepared the paper for publication, Lenny Skutnik printed the initial copies, and Simone Thomas produced the electronic version for CBO's Web site (www.cbo.gov).



Peter R. Orszag
Director

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Some Implications of Increasing U.S. Forces in Iraq

Summary and Introduction

The Administration is currently planning (and has begun to execute) an increase in U.S. ground forces in Iraq. That plan calls for increasing the number of U.S. combat brigades in-theater by 5 above the December 2006 level of 15, peaking at 20 combat brigades deployed. At this time, the Administration has not specified how long it plans to sustain such an increase.

This Congressional Budget Office (CBO) analysis considers the effects of increasing U.S. ground forces in Iraq. In particular, it analyzes the effects on operational tempo and availability of units to respond to other contingencies. To analyze those effects and compare them with the alternatives for employing U.S. forces incorporated in the House and Senate versions of the supplemental appropriation for fiscal year 2007, CBO constructed five deployment scenarios.

- Scenario 1: U.S. force levels return to and are then maintained indefinitely at 15 combat brigades in-theater (that is, no increase in forces beyond what has already been executed);
- Scenario 2: A 4-month increase that builds up to 20 combat brigades in-theater by May 2007 and sustains that increase until August 2007;
- Scenario 3: A 12-month increase that builds up to 20 combat brigades in-theater by May 2007 and sustains that increase until April 2008;
- Scenario 4: A 24-month increase that builds up to 20 combat brigades in-theater by May 2007 and sustains that increase until April 2009; and
- Scenario 5: A withdrawal from Iraq that steadily reduces the number of combat brigades in-theater from current levels until all U.S. combat brigades have departed by June 2008.

This analysis updates CBO's previous work on this topic, *An Analysis of the U.S. Military's Ability to Sustain an Occupation in Iraq* (September 2003) and *An Analysis of the U.S. Military's Ability to Sustain an Occupation in Iraq: An Update* (October 2005), using the same measures of stress on the force (rotation ratios and number of brigades immediately available to respond to other contingencies).

In the scenarios considered by CBO, the increase in forces in Iraq would, as long as it was sustained, increase the pace of deployments for U.S. active-component ground forces. U.S. forces are generally rotated through Iraq and Afghanistan as units (not as individual personnel) according to a "deploy, recover, prepare" cycle. When units are required to deploy more often, they are able to spend less of their time recovering from a deployment and preparing at home station for the next deployment compared with the time they spend deployed. The Army's goal for its active-component combat forces is to maintain at least two units at home station (one recovering and one preparing) for every unit deployed. The Army indicates that this level of operational tempo would be consistent with maintaining a ready force.

Depending on how long it was sustained, the increase in forces in Iraq would cause the ratio of the number of units at home station to every unit deployed to decline from its current level of about 1.2 to approximately 0.9, in CBO's estimation (see Table 1). That change would be an increase of about 30 percent in the rate at which U.S. active-component ground forces were deployed

Table 1.
Ratio of Units at Home Station to Units Deployed Under Alternative Scenarios

Scenario	December 2007	December 2008	December 2009
No Increase in Forces	1.2	1.6	1.8
4-Month Increase in Forces	1.0	1.5	1.8
12-Month Increase in Forces	0.9	1.2	1.7
24-Month Increase in Forces	1.0	1.0	1.4
Withdrawal of Forces	1.3	4.6	7.7
Memorandum:			
Army's Goal	2.0	2.0	2.0

Source: Congressional Budget Office.

compared with maintaining U.S. forces in Iraq at their December 2006 level, and it would have U.S. forces spending more time deployed than at home station. After the increase in forces ended, the operational tempo of U.S. active-component ground forces would eventually recover to about 1.8 units at home station for every unit deployed.¹

The increase in forces in Iraq also would decrease the number of U.S. combat brigades immediately available to respond to other contingencies (see Table 2). In CBO’s analysis, that decrease would continue for at least six months after U.S. forces began to draw down until those units that were deployed had sufficient time at home station to recover from their deployments. After the temporary increase ended, the number of combat brigades immediately available to respond to other contingencies would eventually recover to about 18 to 25. There would, however, be a lag in time before those numbers were achieved—CBO’s analysis indicates that, absent a withdrawal, by December 2009 at most 13 to 21 brigades would be immediately available to respond to another crisis. The Department of Defense’s (DoD’s) planning in the past for executing a major theater war (such as the defense of the Republic of Korea) incorporated five Army divisions, one Marine Corps division, and two armored cavalry regiments—the equivalent, at that time, of 20 to 21 combat brigades. Smaller operations, such as Operation Enduring Freedom (in Afghanistan) or Operation

Uphold Democracy (in Haiti), are often conducted with two to four brigades.

If the increase in forces is sustained into the fall of 2007, deployment tours longer than 12 months for active Army deployments become necessary to provide 12 months of “dwell time” (time spent recovering from a deployment) at home station. When rotation rates fall below one unit at home station for every unit deployed, units have less than 12 months at home station to prepare for their next 12-month deployment. Secretary of Defense Robert M. Gates has committed DoD to providing at least 12 months of dwell time for all units. CBO’s scenarios with 12-month and 24-month increases in forces were modeled using 15-month tours for Army active combat units (consistent with Secretary Gates’ announcement on April 11, 2007, which stated that such deployments would allow DoD to maintain the increase in forces for at least a year). The other cases were modeled using 12-month tours for active Army combat units. That increase in forces, although larger than the previously planned level of 15 combat brigades in Iraq, would be comparable to the level of U.S. ground combat forces in Iraq in the summer and fall of 2003 as well as for the winters of 2004 and 2005 and 2005 and 2006. However, none of those levels was sustained for as long as the 12-month or 24-month increases that CBO considered.

The pool of forces that the United States has available to sustain 15 or 20 brigades in Iraq is 50 active-component Army and Marine Corps combat brigades (rising to 52 by the end of the time period CBO considered) and 37 reserve-component combat brigades (declining to 31 by the end of the time period CBO considered). In addition to deployments to Iraq, that pool must also sustain forces

1. The operational tempo of active-component combat forces in CBO’s model recovers from the current 1.2 units at home station for every unit deployed to the higher level of 1.8 units because of a number of factors, including the relatively limited use of National Guard brigades in 2006, an increased supply of modular brigades, and a lower number of forces deployed.

Table 2.**Brigades Immediately Available Under Alternative Scenarios**

Scenario	Assuming 12 Months Is Required to Recover from Deployments			Assuming 6 Months Is Required to Recover from Deployments		
	Dec. 2007	Dec. 2008	Dec. 2009	Dec. 2007	Dec. 2008	Dec. 2009
No Increase in Forces	5	6	13	13	16	21
4-Month Increase in Forces	4	4	12	11	14	21
12-Month Increase in Forces	4	3	9	11	11	19
24-Month Increase in Forces	4	2	8	12	10	17
Withdrawal of Forces	6	16	33	14	26	38
Memorandum:						
Forces for One Major Theater War	20	20	20	20	20	20

Source: Congressional Budget Office.

Note: Because it is unclear how long units require to recover from a deployment, CBO modeled a range of possible recovery times—6 and 12 months—to illustrate the range of possible effects.

deployed to Afghanistan (normally, three brigades), in Marine expeditionary units (MEUs), and stationed in Korea and Okinawa.²

In all of the cases that CBO considered, the actual effect that the increase in forces in Iraq will have on deployment rates and the availability of units for other contingencies, as well as the specific details of how the increase will affect both active- and reserve-component Army and Marine Corps units, depends on the details of how the increase is executed. At this time, DoD has not publicly released a full schedule of proposed deployments, nor has it committed to a specific length of time to sustain the increase in forces. CBO has compiled publicly available data on deployment dates for all active- and reserve-component Army combat brigades and Marine Corps infantry battalions and constructed plausible future deployment scenarios. Although it is unlikely that those scenarios will precisely match DoD's future announcements, they serve to illustrate the effects of various policy choices.

In the case of a withdrawal from Iraq, the only major deployments that U.S. ground combat forces would need to sustain would be forces in Afghanistan and MEUs. Thus, the operational tempo of active-component

ground combat forces would be reduced, ultimately leading to about 14 units at home station for every unit deployed. The operational tempo of reserve-component ground combat forces would also be reduced, ultimately leading to about 24 units at home station for every unit deployed. In addition, a withdrawal of forces from Iraq would eventually increase the number of combat brigades available to respond to other contingencies to more than 40.

Background on the Deployed Force and Mechanics of the Increase

U.S. forces in the Iraq theater of operation include personnel deployed to both Iraq proper and to neighboring countries (particularly Kuwait). Prior to the announcement of the increase in forces in Iraq, those forces included about 20,000 Air Force personnel, 25,000 Marine Corps personnel (with two regiments deployed), and 120,000 Army personnel (with 13 to 14 brigades deployed).

Not all of those personnel are in ground combat units. An Army combat brigade, depending on its type, will have between 3,400 and 3,800 personnel normally assigned to it (although it is common practice for the Army to assign more personnel to a unit deploying to a combat zone—in that case, personnel fill rates of 105 to 110 percent are normal). The remaining military personnel in-theater are associated with various units that command or support the combat brigades (for example, the

2. MEUs are the Marine Corps forces embarked upon expeditionary strike groups (ESGs, formerly amphibious strike groups). Normally, the core of each MEU is a Marine infantry battalion, and there are four MEUs deployed.

corps headquarters, logistics commands, medical evacuation units, engineers, and so forth) The majority of those personnel perform functions that directly support combat brigades, and their number varies in proportion to the number of combat brigades in-theater.³ Marine Corps regiments are similar in that respect.⁴

Almost all of the U.S. forces in the Iraq theater are deployed there on a rotational basis. That arrangement means that units deploy, along with all of their personnel and most of their equipment, for a finite time and then leave the theater (generally, being replaced by another similar unit).⁵ Army units have typically deployed for 12 months, while Marine Corps units have deployed for 7 months. That schedule allows U.S. forces to return to their home stations to replace personnel and equipment, conduct training activities, and generally recover from the stresses of deployments. To date, DoD has attempted to deploy most ground combat units for no more than one year to the Iraq theater and has attempted to ensure that units receive at least one year at home station before they are deployed to Iraq again. That practice, which means that only a fraction of U.S. forces are deployed at any one time, improves readiness and quality of life for U.S. forces.

Prior to the announcement of the Administration's plan to increase the size of the force in Iraq, DoD had been assuming that the 2007 rotation of forces to Iraq would remain stable at about 15 brigades.⁶ DoD does not announce predicted force levels for more than 6 to 12 months in the future because conditions in Iraq (and, therefore, the demand for forces) may change over time.

3. See Congressional Budget Office, *Estimated Costs of Increasing U.S. Forces in Iraq* (letter to the Honorable John M. Spratt, Jr., February 1, 2007).

4. Marine Corps regiments are similar in size and capability to Army brigades. In this analysis, when CBO is discussing the overall U.S. ground combat force deployed to Iraq, CBO counts regiments as brigades.

5. The Army currently maintains a pool of equipment in the Iraq theater that is provided to units deploying there and retained in-theater when they redeploy out of the theater. In other rotations, units rotate with all of their equipment.

6. Department of Defense, "Adjustments to Iraq Troop-Rotation Schedules Announced Yesterday Will Allow 15 U.S. Combat Brigades to Be in Iraq Through Spring, DoD Officials Said Today" (press release, September 2006), available at www.defenselink.mil/news/newsarticle.aspx?id=1220.

However, most descriptions of the increase in forces have implicitly assumed that once the period of the increase to 20 brigades is over, U.S. forces in Iraq will return to some lower level (such as the prior 15-brigade commitment).

The Administration plans to execute the increase in forces in Iraq largely by extending the tours of some units currently in Iraq and accelerating the deployment of other units already scheduled to deploy there. Therefore, the increase will largely not involve "new" units that were not previously scheduled to deploy to Iraq. For example, by extending the deployment of the 1st Brigade, 34th Infantry Division until August 2007, that brigade will be in Iraq in July 2007, increasing the number of U.S. brigades in Iraq in that month by one compared with a scenario in which the 1st Brigade, 34th Infantry Division had redeployed to its home station in the spring of 2007. Secretary Gates announced on April 11, 2007, that all active-component Army combat brigades in Iraq would have their deployments extended to 15 months (whereas previously, most had been scheduled for 12-month deployments). Extending the tours of all active-component Army units currently in the theater would allow DoD to sustain the increase for about a full year.

In general, regardless of whether U.S. forces in Iraq are increased by deploying units more frequently (accelerating unit deployments, deploying additional units) or by deploying units for longer periods of time (extending deployments), the force will experience comparable levels of increased operational tempo (though that increase may not be distributed equally across all units). Units will experience, on average, a reduction in the amount of time they spend at home station compared with the amount of time they are deployed, and fewer units will be immediately available that are not already deployed or recovering from a deployment.

DoD's policy of providing at least one year of dwell time for all units to recover from a deployment requires tours in Iraq or Afghanistan longer than 12 months when the number of units deployed exceeds the number of units at home station. A 15-month tour for deployed units (as DoD has announced) will allow the forces to operate at ratios as low as 0.8 units at home station for every unit deployed while still allowing 12 months of dwell time for all units.

The increase in forces in Iraq may not lead to a higher operational tempo for the Army National Guard's com-

bat brigades unless it is sustained for a lengthy period. The Army employed the National Guard at a high rate during the 2004–2005 period, which, in combination with DoD’s guidelines for the employment of the reserve component, leaves the Army with relatively few available Army National Guard combat brigades during the 2007–2008 period. That could change if DoD chose not to adhere to the goals in its recently announced policy on the employment of reserve-component combat units.⁷ In addition, the 2007–2008 period is one in which many National Guard combat brigades are scheduled for conversion to the modular configuration, meaning that they would not be available for employment unless the Army changed its plans for those conversions.⁸

It is unlikely that the recently announced decision to enlarge the size of the Army and Marine Corps, including the creation of six active Army combat brigades and one Marine Corps regiment, will affect the available U.S. forces significantly during the time of the increase in U.S. forces in Iraq. The bulk of the funding for the newly created brigades is provided beginning in fiscal year 2008, and recruiting additional personnel and establishing new units will require at least two years beyond that. Thus, most of the additional combat units will not be available in time to participate in the increase in forces in Iraq during the periods spanned by the cases CBO considered—only one additional Army brigade and the additional Marine Corps regiment should be available by the end of the time period CBO considered.

7. DoD’s most recent policy on employing reserve-component units is that units will be mobilized for no more than one year out of every six. Similarly, the Army’s goal for use of its reserve-component combat units is one year mobilized out of every six for “steady-state” conditions and one year out of every five for “surge” conditions. Under those guidelines, National Guard combat brigades mobilized within the past four to five years are not eligible for remobilization. Even under the more relaxed “surge” condition standard, that policy allows only National Guard brigades that have not been mobilized since 2003 to be used in the 2007–2008 time frame, leaving many units ineligible for deployment.

8. DoD has notified four Army National Guard combat brigades that they may be deployed as soon as December 2008. Some of those brigades have previously been deployed within the time period that DoD’s new policy would appear to prohibit. See www.defenselink.mil/releases/release.aspx?releaseid=10711.

Measures of Readiness

CBO was asked to analyze the effects of the temporary increase on the readiness of U.S. ground forces. DoD has traditionally measured and presented readiness in the form of Status of Resources and Training System (SORTS) scores, ranging from C-1 (fully ready) to C-4 (not ready), with C-5 used for units undergoing reorganization.⁹ Because CBO has no way to analyze and definitively predict the effects of deployments of various lengths on SORTS scores, it chose two other measures of readiness.

Rotation Ratios

CBO used rotation ratios as a way of examining stress on the overall force. Rotation ratios—the number of units at home station for every unit deployed—can be generated from publicly available information, can be consistently modeled, and can be compared with public statements made by DoD and service leadership. Longer deployments and shorter recovery times (that is, lower rotation ratios) are clearly associated with greater wear on equipment and less time at home station for necessary training—implying lesser readiness. Because rotation ratios can be translated into dwell-time measurements relatively easily, they can also be compared against simple benchmarks such as “every unit should have at least one year of time at home station between deployments” or “units will be deployed no more than one year out of every six.” Similarly, a rotation ratio of less than one implies that units are spending more time deployed than at home station. To the extent that the occupation of Iraq (along with other deployments) requires that forces be employed more frequently than what is stated in those goals, the force is under more stress than DoD or the services would desire.

9. SORTS is used to provide the readiness data in DoD’s major readiness reporting format to Congress, the *Quarterly Readiness Report*. A unit’s C-rating in SORTS is based on lower-level ratings measuring how many of the unit’s assigned personnel (P-level) and equipment (S-level) it possesses, the condition of that equipment (R-level), and how well trained the unit is (T-level), modified by the unit commander’s subjective judgment of the unit’s readiness.

The DoD leadership has stated goals for operational tempo in terms of rotation ratios.¹⁰ The Army's Force Generation Model, the service's current approach for managing deployments to Iraq and Afghanistan, is intended to establish a rotation ratio of two units at home station for every unit deployed. That model is based on units going through a "deploy, recover, prepare" cyclical readiness construct, similar to what Marine Corps and Navy units have historically used. In the model, during the period of increased demand for forces occasioned by the occupation of Iraq (the model's surge phase), active Army combat units would deploy for one year, recover for one year, and prepare for their next deployment for one year. That approach would leave one-third of the force deployed at any one time, one-third of the force available to respond to other contingencies, and one-third of the force recovering from deployments (and would be functionally identical to the measures used by CBO with a 2.0 rotation ratio, 12-month deployments, and 12 months for units to recover from deployments—the remaining units would be available to respond to other contingencies for 12 months). After the end of the occupation of Iraq, the model calls for twice as many active Army combat units to be preparing for deployment as are either deployed or recovering from a deployment (the model's steady-state phase).¹¹ That arrangement would leave one-quarter of the force deployed at any one time, one-half of the force available to respond to other contingencies, and one-quarter of the force recovering from deployments (and would be identical to the measures used by CBO, except with a 3.0 rotation ratio).

10. Between 2002 and 2003, DoD changed the way it measures rotation ratios. Previously, those ratios referred to the total number of units in the force for every unit deployed. The previous definition was exactly equivalent to the new definition plus one (in the new formulation, the deployed unit itself is not counted). CBO's previous work on the sustainability of the occupation in Iraq used the old definition; however, this analysis adopts the new definition.

11. The terms "steady state" and "surge" are the Army's. In this context, surge does not refer (as it does in press accounts) to the proposed increase in forces in Iraq. Instead, it refers to the first phase of the implementation of the Army's Force Generation Model. That first phase appears to be roughly equivalent to the duration of the occupation of Iraq, for however long the occupation is maintained.

In addition, DoD's most recent revisions to its reserve-component employment policy (units mobilized no more than one year out of every six) imply a desired rotation ratio for reserve-component units of about seven units at home station for every unit deployed.¹² The Army's Force Generation Model calls for a National Guard combat unit to be mobilized one year out of every five under surge conditions and one year out of every six under steady-state conditions.

Brigades Immediately Available for Other Contingencies

The United States maintains forces deployed to a number of locations and is frequently concerned with a wide range of potential contingencies that might arise unexpectedly. It is possible to model how many units would be immediately available for other contingencies in a fairly direct fashion, given assumptions about how long after a deployment a unit needs to recover. It is not clear from the readiness data available to CBO how long units require to recover from a deployment. In addition, the United States does not have extensive historical experience with rotating large numbers of Army units at current rates over extended periods, so there is no historical analogy that can be used. Because of that uncertainty, CBO showed a range for how many units would be available to respond to other contingencies. The specific recovery times used to generate that range are bracketed on the high end by the one year of dwell time that the Army and DoD have repeatedly stated they strive to provide all units before redeploying them. At the low end, it

12. DoD's goals for rotation ratios for active- and reserve-component units differ in an important way. Goals for active-component units are based on deployed versus nondeployed time, whereas goals for reserve-component units are based on mobilized versus nonmobilized time. Because reserve-component units require some time while mobilized to train, deploy, and redeploy, the effective rotation ratio for deploying reserve-component units will be lower than the rotation ratio for mobilizing reserve-component units. One of the Army's goals is to reduce the amount of time its National Guard brigades require in a mobilized but not deployed status, by improving premobilization training activities. See Department of Defense, "DoD Announces Changes to Reserve Component Force Management Policy" (press release, January 2007), available at www.defenselink.mil/releases/release.aspx?releaseid=10389.

is not clear how fast a unit might recover, so CBO used a six-month recovery time to illustrate the sensitivity of this metric to the assumptions used.¹³

The range of recovery times also illustrates an important element of any U.S. response to a potential contingency. Presumably, in any other contingency, DoD would deploy first its most ready forces (those that had recovered most fully from a deployment), with less ready forces deployed later and as needed. In such a response, it is possible to think of the different numbers of brigades immediately available for other missions as illustrating the numbers of forces available for contingencies of different priorities. For a low-priority mission, one for which DoD was unwilling to accept much risk, it would perhaps only employ fully recovered brigades with 12 months since their last deployment. However, for a high-priority mission, which DoD considered urgent, it would perhaps be willing to employ brigades with only 6 months (or even less) since their last deployment; that is, for an important enough mission, DoD might be willing to employ less ready units. Hence, the pool of units immediately available could increase with respect to higher priority contingencies.

This measure reflects only the units immediately available for deployment. Over a sufficient period of time, for a contingency that national policymakers considered important enough, effectively all U.S. ground forces could be deployed. In the time period CBO analyzed, that would include 43 active Army and 28 National Guard brigades, 9 active and 3 Marine Corps Reserve regiments, for 83 brigades total. Given sufficient time, units currently recovering from deployments could be made ready (and, with a sufficiently important contingency, that might be a very short period of time), National Guard brigades and Marine Corps Reserve regiments could be mobilized and trained, and in extreme cases, units could be withdrawn from contingencies in other theaters.

13. Arguably, units could recover extremely rapidly if unit commanders were aware of time pressure. Less essential training exercises could be canceled, equipment could be retained in the unit instead of being sent to depots for scheduled maintenance, personnel could be retained in the unit instead of being reassigned, and so on. However, most of those measures would require advance knowledge that the unit would be needed on short notice. An unexpected contingency (the most common kind) would not permit any of those countermeasures to be employed in advance.

As such, the number of ground forces the United States would have available to respond to another contingency is always sensitive to the national importance of the other contingency and the time period in which a response is required. Although 20 brigades is an appropriate amount of forces to assume would be required for a major contingency (such as, for example, the defense of the Republic of Korea), it is possible that the United States could still prevail in any such contingency in cases in which it would have fewer than 20 brigades immediately available. Although the U.S. response might be more difficult or slower than ideal, it would always be possible, given sufficient time, to send additional forces to such an operation.

CBO's Model of Future Deployments

To analyze the increase in forces in Iraq, CBO constructed a model of how U.S. ground combat forces have been and would be deployed. That model tracks the status of all active- and reserve-component Army and Marine Corps combat units by month, detailing which units are deployed to Iraq, Afghanistan, Marine expeditionary units, or other assignments; which units are deploying or redeploying; which units are being converted to Stryker brigades or modular brigades; when new active Army combat brigades have been or are planned to be established; and the time each unit has had at home station since its last deployment. For estimating deployments in the future, the model assumes that units would be deployed on the basis of how long they have had since their last deployment, with units that have had longer to recover being deployed first. Deployments are scheduled so as to maintain the levels of forces specified for each scenario that CBO considered.

Except for the withdrawal case, CBO's model assumes that U.S. forces in Iraq will be maintained indefinitely at the level of 15 combat brigades after the end of any given temporary increase. That level is usually composed of two Marine Corps regiments, two to three Army National Guard brigades, and 10 to 11 active Army brigades. It also assumes that U.S. forces in Afghanistan will be maintained indefinitely at the level of three combat brigades beyond 2007, usually composed of one Army National Guard brigade and two active Army brigades. In addition, it assumes that the Marine Corps continues to deploy Marine expeditionary units, maintains forces in Okinawa, and builds to 9 active regiments by 2008 and that the Army maintains the 1st Brigade, 2nd Infantry Division, in Korea, restructures 6 National Guard com-

bat brigades by 2009, and builds to 43 active combat brigades by 2009.¹⁴ This model provides CBO's analytic results for what the effects of any given deployment pattern are on the operational tempo of active- and reserve-component ground combat forces as well as the number of brigades that would be available to respond to another contingency.

CBO measured operational tempo using rotation ratios. Those ratios can be converted to the common alternative metric of dwell time roughly by multiplying them by 12 months (assuming 1-year deployments). Hence, a rotation ratio of 2:1 (or 2.0), with two units at home station for every unit deployed (the Army's goal for its active-component brigades), and with 1-year deployments, means a 24-month dwell time. In CBO's model, rotation ratios are averages of the ratio over the past 12 months, so the rotation ratio in December 2007 provides the average rotation for calendar year 2007.¹⁵ Those ratios are calculated by dividing the supply of available combat units (the entire force minus units dedicated to Korea) by the demand for units (all units that are deployed, deploying, or redeploying). Active- and reserve-component rotation ratios are tracked separately.

Another readiness metric is the number of brigades that would be available to immediately respond to another contingency, should they be needed. It excludes all units that are currently deployed (except for MEUs); units that are deploying, redeploying, or converting to Stryker or modular configuration; and units that have returned from a previous deployment in the past 6 or 12 months (depending on the assumptions made about how long units require to recover from a deployment).¹⁶ It excludes all National Guard brigades because they usually require

some time for mobilization and training before they can be deployed and are thus not immediately available. Those values are also averaged over the previous 12 months.

For comparison, DoD's planning in the 1990s assumed that five Army divisions, one Marine Corps division, and two armored cavalry regiments—the equivalent, at that time, of 20 to 21 combat brigades—would be necessary to prosecute a major theater war. The initial phase of Operation Iraqi Freedom was conducted with only 10 U.S. brigades; however, many other forces (such as the 4th Infantry Division and 3rd Armored Cavalry Regiment) were still being deployed. Once all of those forces had arrived in-theater (by May 2003), the total size of the force deployed for Operation Iraqi Freedom was also about 20 brigades. Smaller operations, such as Operation Enduring Freedom (in Afghanistan), or Operation Uphold Democracy (in Haiti), are frequently conducted with as few as two to four combat brigades.

CBO's model has some limitations. CBO constructed its model using publicly available information, including non-DoD sources, which may not be completely accurate. DoD has not, to date, provided CBO with detailed information about either past deployments of U.S. forces or planned future deployments. Because of those data limitations, the model tracks forces over time at the level of brigades and months. For some cases—such as precisely describing deployments of Marine Corps forces, tracking exact force levels during the annual rotation of forces, or tracking the exact amount of time consumed by deployment and redeployment—that level of aggregation can provide only approximations.

CBO's model is also sensitive to certain assumptions. For example, the rotation ratios generated by the model that measure operational tempo are affected by decisions CBO made about how heavily to emphasize active- or

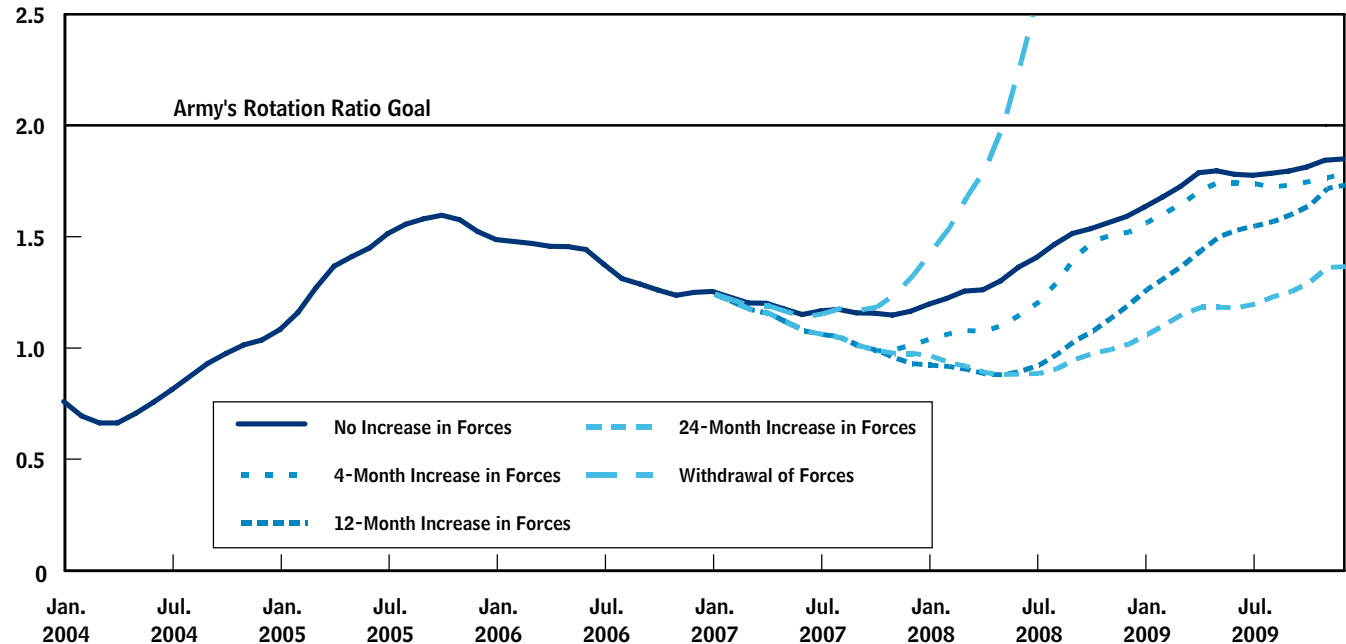
14. For reference, prior to the decision to expand the size of the Army by 6 active-component brigades, the Army had a planned strength of 42 active brigades, with a future decision as to whether it would establish a 43rd brigade. The decision by the Administration in January 2007 to increase the size of the Army has rendered the Army's decision moot (since the Army will grow to 48 brigades), but 1 new brigade is available relatively rapidly compared with the other 5, as the Army had already planned for a 43rd brigade. CBO's model assumes that new brigade will be available at the beginning of fiscal year 2009.

15. It is necessary to average rotation ratios over a significant period of time to provide a meaningful measure of the broader effects of changes in the size of the deployed force. Any rotation ratio calculated for a time period of less than a year will be highly sensitive to such short-term phenomena as the annual rotation of forces.

16. CBO's previous work on the sustainability of the occupation assumed that units with 12 months or less of time since returning from their last deployment would be unavailable to immediately respond to other contingencies. See Congressional Budget Office, *An Analysis of the U.S. Military's Ability to Sustain an Occupation in Iraq* (September 2003), available at www.cbo.gov/showdoc.cfm?index=4515&sequence=0. This analysis relaxes that assumption; however, DoD policy requires 12 months of dwell time for units at home station before deploying them again, so the 12-month recovery cycle best approximates actual DoD practice.

Figure 1.**Rotation Ratios Under Alternative Scenarios**

(Ratio of units at home station to units deployed)



Source: Congressional Budget Office.

reserve-component participation in future deployments to Iraq. In addition, the number of units immediately available for other contingencies derived from CBO's model depends on assumptions about how long units might require to recover from a deployment (in this analysis, 6 or 12 months).

The Results of CBO's Analysis of Five Deployment Scenarios

CBO derived rotation ratios for the five deployment scenarios it considered in this analysis (see Figure 1). Except for the scenario of troop withdrawal, all of the scenarios show lower rotation ratios than the Army's stated goal of 2.0. Historically, the path of operational tempo reached a sharp low in early 2004 (when essentially every active-component unit in the Army had deployed for Operation Iraqi Freedom or replaced a unit that had deployed), recovered through 2005 (when the Army made very extensive use of National Guard combat forces), and slowly declined through 2006 (when the Army made much more sparing use of National Guard combat forces and was still creating new modular brigades).

The number of brigades immediately available to respond to other contingencies varies in each scenario (see Figure 2). Those calculations assume that units require 6 months to recover after a deployment; the number of available brigades declines under the alternative assumption that units require 12 months to recover after a deployment (see Figure 3). For all scenarios, CBO assumed that a 20-brigade level of forces would be necessary to conduct a major theater war. DoD policy requires units to have at least 12 months of time to recover from a deployment before being deployed again; as such, Figure 3 presents the number of brigades immediately available that is most consistent with DoD's current practice.

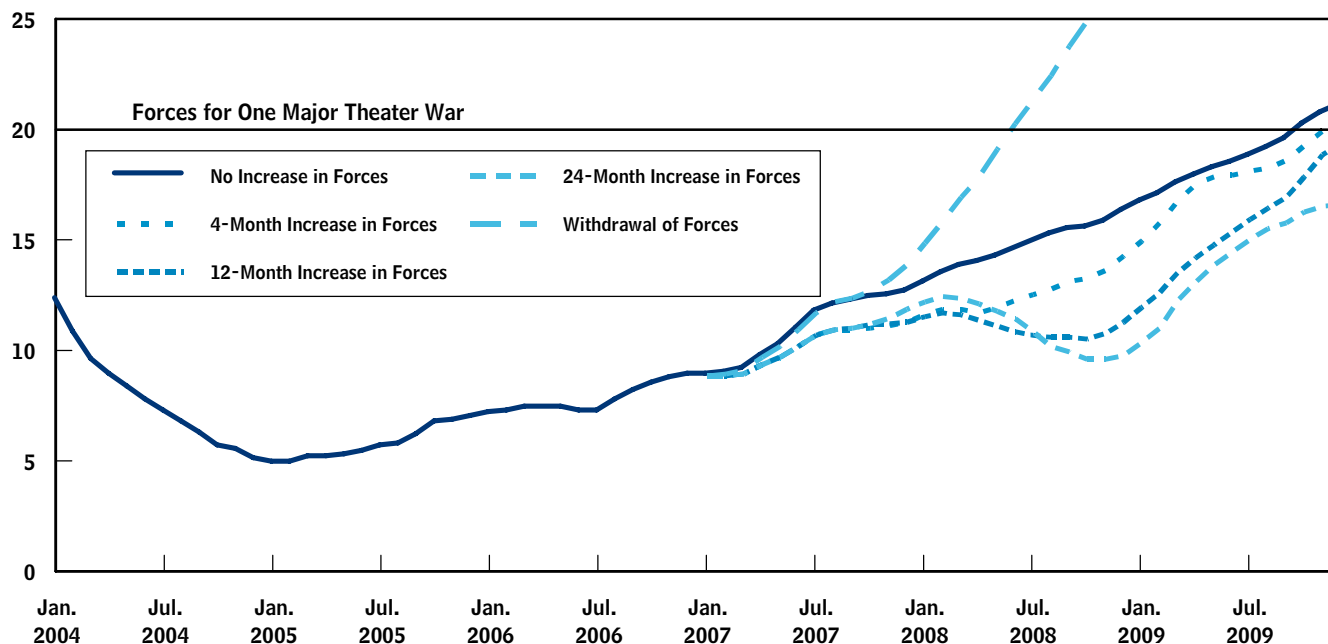
Scenario 1: No Increase in Forces

In this case, the operational tempo of U.S. active-component ground combat forces recovers from the stress of the 2006 deployment and stabilizes at a rate of 1.8 units at home station for every unit deployed (see Figure 1). The scenario maintains 12-month deployment tours for active-component Army combat forces. The recovery is largely due to the availability of Army

Figure 2.

Units Available for Other Contingencies at 6 Months' Recovery Under Alternative Scenarios

(Brigades immediately available to respond)



Source: Congressional Budget Office.

modular and Stryker brigades. The number of combat brigades immediately available to respond to other contingencies steadily increases from between 4.8 and 9.8 brigades in April 2007 (assuming 12 or 6 months of recovery time) to between 12.5 and 21.1 at the end of calendar year 2009 (see Figures 2 and 3).¹⁷ In this case, the Army National Guard's combat brigades stabilize at about 7 units at home station for every unit deployed. It should be noted that this case does not strictly have 15 brigades in Iraq indefinitely because some units that will constitute the increase have already been deployed to Iraq. However, in this case, those units are not further reinforced, and unit extensions (such as the extension of the 1st Brigade, 34th Infantry Division) are reversed, leading U.S. force levels in Iraq to return to 15 brigades by July 2007.

17. In this case, as in all of CBO's modeled deployment scenarios, fractional numbers of brigades immediately available are a result of averaging over 12 months.

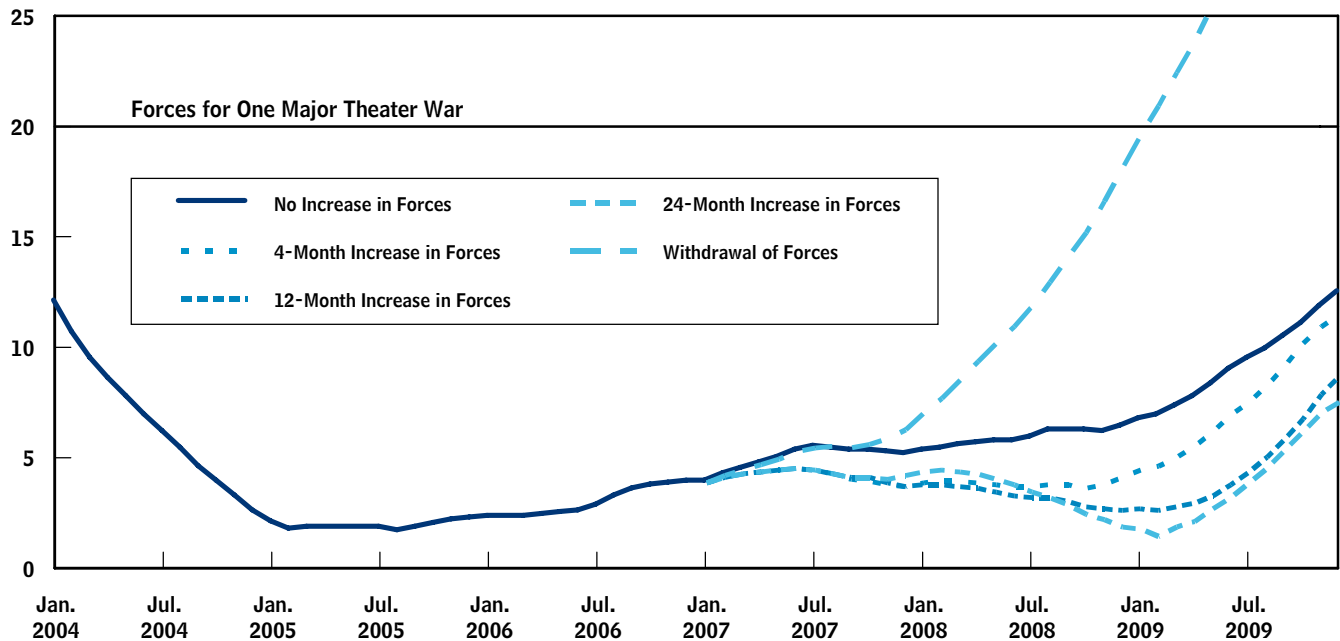
Scenario 2: A Four-Month Increase in Forces

In this case, with U.S. forces in Iraq increasing to 20 brigades by May 2007 and remaining at that level through August 2007, the operational tempo of U.S. active-component ground combat forces increases—and the corresponding rotation ratio decreases—to a low of 1 unit at home station for every unit deployed (in October 2007). As operational tempo subsequently declines, the rotation ratio increases toward the stable level of 1.8 units at home station about 6 months later than is the case in Scenario 1 (see Figure 1). It is possible to execute this increase while still maintaining 12-month deployment tours for active-component Army combat forces. The number of combat brigades immediately available to respond to other contingencies drops to a low of between 3.8 and 11.2 brigades in November 2007 (assuming 12 or 6 months of recovery time) before rising toward between 11.6 and 20.5 at the end of calendar year 2009 (see Figures 2 and 3). In this case, the Army National Guard's combat brigades stabilize at about 7 units at home station for every unit deployed.

Figure 3.

Units Available for Other Contingencies at 12 Months' Recovery Under Alternative Scenarios

(Brigades immediately available to respond)



Source: Congressional Budget Office.

Scenario 3: A 12-Month Increase in Forces

In this case, with U.S. forces in Iraq increasing to 20 brigades by May 2007 and remaining at that level through April 2008, the operational tempo of U.S. active-component ground combat forces increases—and the corresponding rotation ratio decreases—to a low of 0.9 units at home station for every unit deployed (from December 2007 through July 2008). Thereafter, operational tempo declines and the rotation ratio increases toward the stable level of 1.8 units at home station (see Figure 1). This case would require increasing the length of deployments to 15-month tours for active-component Army forces. The number of combat brigades immediately available to respond to other contingencies drops to a low of between 2.7 and 11.3 brigades in December 2008 (assuming 12 or 6 months of recovery time) before rising toward between 8.8 and 19.4 at the end of calendar year 2009 (see Figures 2 and 3). In this case, the Army National Guard's combat brigades stabilize at about 7 units at home station for every unit deployed.

Scenario 4: A 24-Month Increase in Forces

In this case, with U.S. forces in Iraq increasing to 20 brigades by May 2007 and remaining at that level through April 2009, the operational tempo of U.S. active-component ground combat forces increases—and the corresponding rotation ratio decreases—to a low of 0.9 units at home station for every unit deployed (from February 2008 through August 2008). Thereafter, operational tempo declines and the rotation ratio increases toward (but does not reach during the time period CBO modeled) the stable level of 1.8 units at home station (see Figure 1). This case would require increasing the length of deployments to 15-month tours for active-component Army forces. The number of combat brigades immediately available to respond to other contingencies drops to a low of between 1.5 and 11.1 brigades in February 2009 (assuming 12 or 6 months of recovery time) before rising toward between 7.6 and 16.7 at the end of calendar year

2009 (see Figures 2 and 3).¹⁸ The Army National Guard's combat brigades stabilize at about 7 units at home station for every unit deployed.

Scenario 5: Withdrawal of Forces

In this case, with U.S. forces in Iraq decreasing until complete withdrawal in July 2008, the operational tempo of U.S. active-component ground combat forces declines—and the corresponding rotation ratio increases rapidly—to a level of 14 units at home station for every unit deployed in August 2009. There is no need in this case to extend the length of deployment tours. The number of combat brigades immediately available to respond to other contingencies steadily increases to about 40 at the end of calendar year 2009. In this case, the Army National Guard's combat brigades stabilize at about 24 units at home station for every unit deployed. Once U.S. forces are withdrawn from Iraq, the only major deployments that must be sustained are those for Afghanistan and MEUs, implying that the bulk of U.S. ground forces are at their home station.

Rotation Ratios and Units Immediately Available: An Example

For all of CBO's deployment scenarios other than withdrawal, U.S. forces in Iraq eventually decline to 15 combat brigades and remain there indefinitely. If that level of forces was maintained without change forever (as a hypothetical example), all other U.S. commitments remained stable, and the total number of Army and Marine Corps combat brigades remained stable, then the rotation ratio and number of combat brigades immediately available for other contingencies would approach a steady-state level. That level can be used to describe how CBO's measures of the stress on the forces are generated and the effects that changes in force levels have on those measures.

At the steady-state level of 15 combat brigades in Iraq, the United States would have a supply of 52 active-

component combat brigades (43 Army and 9 Marine Corps) and 31 reserve-component combat brigades (28 Army National Guard and 3 Marine Corps Reserve). There would also be a steady U.S. commitment of 12 to 13 active and two to three reserve combat brigades in Iraq (maintaining 15 at all times), two active combat brigades and one reserve combat brigade to Afghanistan, two active combat brigades to Korea and Okinawa, and one active combat brigade's worth of forces dedicated to MEUs.

Assuming that all forces in Iraq and Afghanistan are deployed for 12-month tours and that they require a month each to deploy to the theater and redeploy to home station from the theater, there will be an additional three brigades that will be either deploying or redeploying at any one point, on average, over the course of a full year.¹⁹ Also, there will be one brigade recovering from a deployment for every brigade deployed, under the assumption that units have 12-month tours and require 12 months to recover from a deployment.²⁰ Under the assumption that units require 6 months to recover, there will be half as many units recovering from a deployment as are deployed. All active units (other than MEUs, which are deployed in order to be immediately available) that are not deployed, deploying, redeploying, or recovering from a deployment should be immediately available for other contingencies. In this case, with 52 active combat brigades, there would be 17.6 brigades immediately available (assuming 12 months for recovery after a deployment; see Table 3) to 25.3 brigades immediately available (assuming 6 months for recovery after a deployment; see Table 4).

For the rotation ratio, the supply of forces is 50 active-component brigades (the total of 52 minus the two allocated to Korea and Okinawa). The demand for forces is the number of forces deployed, deploying, or redeploying (17.9 for active-component forces, which comprises 15.5 brigades deployed and 2.4 deploying or redeploying, and 4.1 for reserve-component forces, which comprises 3.5

18. In this case, using 15-month tours for deployment causes a short-term improvement in the number of combat brigades immediately available compared with the 4-month and 12-month increases around the January 2008 time frame. That improvement occurs because the transition to 15-month tours from 12-month tours essentially puts deployments to Iraq on pause for three months, allowing units at home station to recover. There is a similar, but much smaller, effect at work in the 12-month case (which uses fewer 15-month tours).

19. Forces in Korea do not rotate to the theater but are instead stationed there permanently and, as such, do not require any time for deployment or redeployment. Similarly, MEUs, which are embarked on expeditionary strike groups, do not require additional time for deployment or redeployment.

20. Because they are stationed there permanently, forces in Korea do not require time to recover from deployment.

Table 3.**Disposition of U.S. Combat Brigades for a Steady 15-Brigade Occupation of Iraq, Assuming 12 Months Is Required to Recover from a Deployment**

	Deployed	Deploying or Redeploying	Recovering	Unavailable	Available	Total
Active Component						
Iraq	12.5	2.1	12.5	27.1	n.a.	n.a.
Afghanistan	2.0	0.3	2.0	4.3	n.a.	n.a.
MEUs	1.0	n.a.	1.0	1.0 ^a	n.a.	n.a.
Subtotal, active	15.5	2.4	15.5	32.4	n.a.	n.a.
Korea/Okinawa	2.0	n.a.	n.a.	2.0	n.a.	n.a.
Total, active	17.5	2.4	15.5	34.4	17.6	52.0
Reserve Component						
Iraq	2.5	0.4	n.a.	n.a.	n.a.	n.a.
Afghanistan	1.0	0.2	n.a.	n.a.	n.a.	n.a.
Total, reserve	3.5	0.6	n.a.	4.1	26.9	31.0

Source: Congressional Budget Office.

Note: Numbers may not sum to totals because of rounding; n.a. = not applicable.

a. Because Marine expeditionary units (MEUs) are deployed in order to be rapidly available, the deployed MEUs are not tallied as unavailable.

deployed and 0.6 deploying or redeploying). The active-component rotation ratio is thus 50 divided by 17.9, minus 1—in other words, 1.8 units at home station for every unit deployed. The supply of reserve-component brigades is 31; hence, the reserve-component rotation ratio is 31 divided by 4.1, minus 1—or 6.6 units at home station for every unit deployed.

Because all of CBO's modeled deployment scenarios other than the withdrawal case posit U.S. forces in Iraq eventually being reduced to 15 combat brigades (and then sustained at that level indefinitely), all of the scenar-

ios converge toward those rotation ratios and numbers of brigades immediately available for deployment. In particular, rotation ratios converge toward the stable level of 1.8 units at home station for every unit deployed relatively rapidly after the termination of the increase in U.S. forces in Iraq. Brigades available for immediate deployment, as a measure, lags somewhat more—assuming that 12 months are required for units to recover from a deployment, the number of available brigades cannot begin to recover toward its stable level until 12 months after the termination of the increase in U.S. forces in Iraq.

Table 4.**Disposition of U.S. Combat Brigades for a Steady 15-Brigade Occupation of Iraq, Assuming 6 Months Is Required to Recover from a Deployment**

	Deployed	Deploying or Redeploying	Recovering	Unavailable	Available	Total
Active Component						
Iraq	12.5	2.1	6.3	20.8	n.a.	n.a.
Afghanistan	2.0	0.3	1.0	3.3	n.a.	n.a.
MEUs	<u>1.0</u>	<u>n.a.</u>	<u>0.5</u>	<u>0.5^a</u>	n.a.	n.a.
Subtotal, active	15.5	2.4	7.8	24.7	n.a.	n.a.
Korea/Okinawa	<u>2.0</u>	<u>n.a.</u>	<u>n.a.</u>	<u>2.0</u>	n.a.	n.a.
Total, active	17.5	2.4	7.8	26.7	25.3	52.0
Reserve Component						
Iraq	2.5	0.4	n.a.	n.a.	n.a.	n.a.
Afghanistan	<u>1.0</u>	<u>0.2</u>	n.a.	n.a.	n.a.	n.a.
Total, active	3.5	0.6	n.a.	4.1	26.9	31.0

Source: Congressional Budget Office.

Note: Numbers may not sum to totals because of rounding; n.a. = not applicable.

a. Because Marine expeditionary units (MEUs) are deployed in order to be rapidly available, the deployed MEUs are not tallied as unavailable.